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ERRI, M.S.		
JLTON, J.C.		
IACOMINI, J.		
ARTINEZ, L.A.		
OTES, J.L.		
RICE, K.D.		
OWERS, K.		
COTT, G.K.		
HELTON, D.C.		
PEARS, M.S.		
JOR, N.R.	X	
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OR CONTROL	X	X
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CLASSIFICATION:		
CNI		
NCCLASSIFIED		
CONFIDENTIAL		
SECRET		

July 6, 2000

00-RF-02060

Ms. Norma Castaneda
Environmental, Safety and Health
Program Assessment
DOE, RFFO

REVISED MAJOR MODIFICATION TO THE OPERABLE UNIT 1 CORRECTIVE ACTION
DECISION/RECORD OF DECISION – JLB-021-00

Action: Request document and comments be transmitted to Environmental Protection
Agency (EPA) and Colorado Department of Public Health and Environment (CDPHE)

Enclosed are ten (10) copies of the Major Modification to the Operable Unit 1 (OU 1)
Corrective Action Decision/Record of Decision (CAD/ROD) revised to address the DOE legal
comments received via e-mail on June 23, 2000. Also enclosed with this letter are ten (10)
copies of the responses to the EPA and CDPHE comments on the Draft Proposed Major
Modification to the OU 1 CAD/ROD dated March 6, 2000, and a draft transmittal letter to the
Agencies.

The recommended distribution is six copies for the Department of Energy, Rocky Flats Field
Office (DOE, RFFO), two copies to the EPA, and two copies to the CDPHE. We recommend
that the DOE, RFFO request both Agencies provide formal approval of the amended OU 1
CAD/ROD document. Once written approval is received, please release the document for a
public comment period.

The documents enclosed with this letter shall replace those OU1 CAD/ROD documents
submitted to the DOE on May 25, 2000 (see Kaiser-Hill transmittal letter #00-RF-01692).

Please contact me at extension 5245 if you have any questions.

AUTHORIZED CLASSIFIER
SIGNATURE

TEX 042-99
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J. Lane Butler
Manager, Environmental Restoration Projects

I REPLY TO RFP CC
O:

JLB:dm

Orig. and 1 cc – Norma Castaneda

CTION ITEM STATUS

Enclosures:
As Stated

PARTIAL/OPEN

CLOSED

TR APPROVALS:

RIG & TYPIST INITIALS

r-Hill Company, L.L.C.

er Address: Rocky Flats Environmental Technology Site, State Hwy. 93 and Cactus, Rocky Flats, CO 80007 • 303.966.7000

ig Address: P.O. Box 464, Golden, Colorado 80402-0464



A-0001-001400

Y/19

July 5, 2000

Mr. Tim Rehder
U.S. Environmental Protection Agency, Region VIII
999 18th Street, Suite 500, EPR-FT
Denver, Colorado 80202-2466

Mr. Steven Gunderson
Colorado Department of Public Health
and Environment
4300 Cherry Creek Dr. South
Denver, Colorado 80246-1530

Enclosed is the revised Major Modification to the Operable Unit 1 (OU 1) Corrective Action Decision/Record of Decision (CAD/ROD) for your approval. Also enclosed are the Department of Energy's (DOE) responses to your Agency's comments on the Draft Proposed Major Modification to the OU 1 CAD/ROD dated March 6, 2000.

As discussed in the meeting on April 12, 2000 and as addressed in the comment responses, DOE plans to continue pumping the OU 1 Collection Well for one year following signing of the Major Modification to the OU 1 CAD/ROD if there is a continued declining trend in the concentrations of trichloroethene below Tier I action levels. Upon cessation of groundwater pumping, the Collection Well will be monitored as a Plume Definition well in accordance with the Integrated Monitoring Plan as a means of evaluation of impacts to surface water. This language has been incorporated into the amended OU 1 CAD/ROD.

Based upon verbal concurrence by Mr. Gary Kleeman and Mr. Carl Spreng of your staff at the meeting held on April 12, 2000, decommissioning the OU 1 French Drain can proceed without finalization of the Major Modification to the CAD/ROD. It was agreed at the April 12 meeting that a remedial design document for the French Drain project will not be required. Instead, the Work Plan for the French Drain project will be submitted to the agencies. The planned method for decommissioning the French will involve breaching the system at the lowest point to divert groundwater approximately 80 feet to the South Interceptor Ditch. This action is described in the amended CAD/ROD and has been discussed and approved by the RFETS Surface Water Group. The French Drain project is scheduled for completion in Fiscal Year 2000.

We would very much appreciate you transmitting your formal approval of the amended OU 1 CAD/ROD document. Upon receipt of written approval, the DOE plans to release this document for a public comment period. If you have any questions concerning this document, please contact Ms. Norma Castaneda at (303) 966-4226 or contact me at (303) 966-5918.

Joseph A. Legare
Assistant Manager
For Environmental and Infrastructure

Enclosure

Cc w/Enclosure:

**Responses to the Environmental Protection Agency Comments on the
Draft Proposed Major Modification to the CAD/ROD for Operable Unit 1**

This document provides responses to the written comments from the Environmental Protection Agency (EPA) regarding the Draft Proposed Major Modification to the Corrective Action Decision/Record of Decision for Operable Unit 1. Each comment received from EPA is presented below in Bold type followed by the corresponding response. An additional comment was received on the 5-year review. This comment will be addressed independently.

1. **EPA agrees with the proposed modifications to the OU1 CAD/ROD, with the exception of DOE's proposal to collect groundwater from the collection well for only one more year if concentrations of TCE remain below the Tier I value of 500 ug/L during that time. As was stated in our December 21, 1999, recommendations letter, EPA believes that collection of this groundwater through the year 2003 would very likely reduce the concentration of TCE in it to a level approximating the Tier II groundwater value. This is based upon the declining trend that is shown in Figure 1 of your draft document and can be explained by the fact that this is a fairly small plume of contaminated water that is being reduced in concentration simply by collecting it from this location. Since the Consolidated Water Treatment Facility is scheduled to remain online until the year 2005, very little cost savings would be achieved by discontinuing the collection and treatment of this contaminated groundwater as proposed. Therefore, EPA recommends that this document be revised such that the collection well continue to be utilized in its present manner through 2003 or until Tier II values are achieved for more than two consecutive sampling events, whichever comes first.**

Response:

Based on the OU1 CMS/FS modeling results and the conclusions presented in the Final Post-CAD/ROD Investigation Report, the source of contamination at IHSS 119.1 has been removed. The existing small plume is relatively immobile and has a low potential to impact surface water in the future.

It has been estimated that, on an annual basis, approximately 17,000 gallons of groundwater are pumped from the Collection Well and treated. Based on an average concentration of 423 ug/L TCE detected in groundwater over the past five quarters, approximately 27 grams, or 1 ounce, of TCE per year is removed from groundwater at an estimated cost of \$40,000. These dollars could be used to fund other more beneficial projects.

It is DOE's intent to discontinue operation of the Collection Well one year after signing the Major Modification to the OU1 CAD/ROD. After that time, if the declining trend for TCE concentrations in the well continue to be below the Tier I action level (500 ug/L), the well will be designated as a Plume Definition Well and monitored consistent with the RFETS Integrated Monitoring Plan. This language has been added to the CAD/ROD.

**Responses to the Environmental Protection Agency Comments on the
Draft Proposed Major Modification to the CAD/ROD for Operable Unit 1**

2. **Monitoring elements of the proposed remedy should be consistent with the Integrated Monitoring Plan (IMP). Upon cessation of pumping, the Collection Well could become a Plume Definition Well. The IMP already recognizes wells #4787 and #4887 as Plume Extent wells for the purpose of monitoring this plume. If groundwater in these wells exceeds Tier II Action Levels, an evaluation is required to determine if remedial or management action is necessary to prevent surface water from exceeding standards. This IMP-defined decision rule should form the framework of decision statements for the OU1 remedy modification. Removing the french drain eliminates a line of defense for surface water and emphasizes the need to include an evaluation of impacts to surface water.**

Response:

The Collection Well is currently monitored as a Performance Well per the IMP in an area known to be contaminated above the Tier II action level. Upon cessation of groundwater pumping and treatment, the Collection Well will be monitored as a Plume Definition Well in accordance with the IMP. As such, the Collection Well concentrations will be monitored and evaluated against Tier I action levels and the historic contaminant data trends. If concentrations in the Collection Well are observed above Tier I action levels, impacts to surface water will be evaluated to determine if an action is necessary. This language has been added to the CAD/ROD.

**Responses to the Colorado Department of Public Health and Environment Comments on the Draft
Proposed Major Modification to the CAD/ROD for Operable Unit 1**

This document provides responses to the written comments from the Colorado Department of Public Health and Environment (CDPHE) regarding the Draft Proposed Major Modification to the Corrective Action Decision/Record of Decision for Operable Unit 1. Each comment received from CDPHE is presented below in Bold type followed by the corresponding response.

1. **Since a declining trend in concentration, as shown by a linear regression, is the justification for modifying the original remedy, the same justification should be used for discontinuing operation of the Collection Well. Cessation of pumping and treating should occur only if this linear regression of TCE concentrations continues to decline for at least one year following CAD/ROD approval.**

Response:

Concentrations of TCE in the Collection Well have remained below the Tier I action level of 500 ug/L since June 1998, and continue to show a declining trend as indicated on the attached concentration plot (also included in the CAD/ROD). Operation of the Collection Well will continue for one year after signing the Major Modification to the OU1 CAD/ROD. After that time, if the declining trend for TCE concentrations in the well continue to be below the Tier I action level (500 ug/L), then pumping and treating of groundwater will be discontinued. The Collection Well will then be designated as a Plume Definition Well and monitored consistent with the RFETS Integrated Monitoring Plan.

2. **Leaving a groundwater plume contaminated at levels just below Tier I assumes that natural attenuation will occur so that surface water will not be impacted at levels two orders of magnitude less. Since this assumption is inherent in the proposal, monitored natural attenuation should be incorporated into the remedy.**

Response:

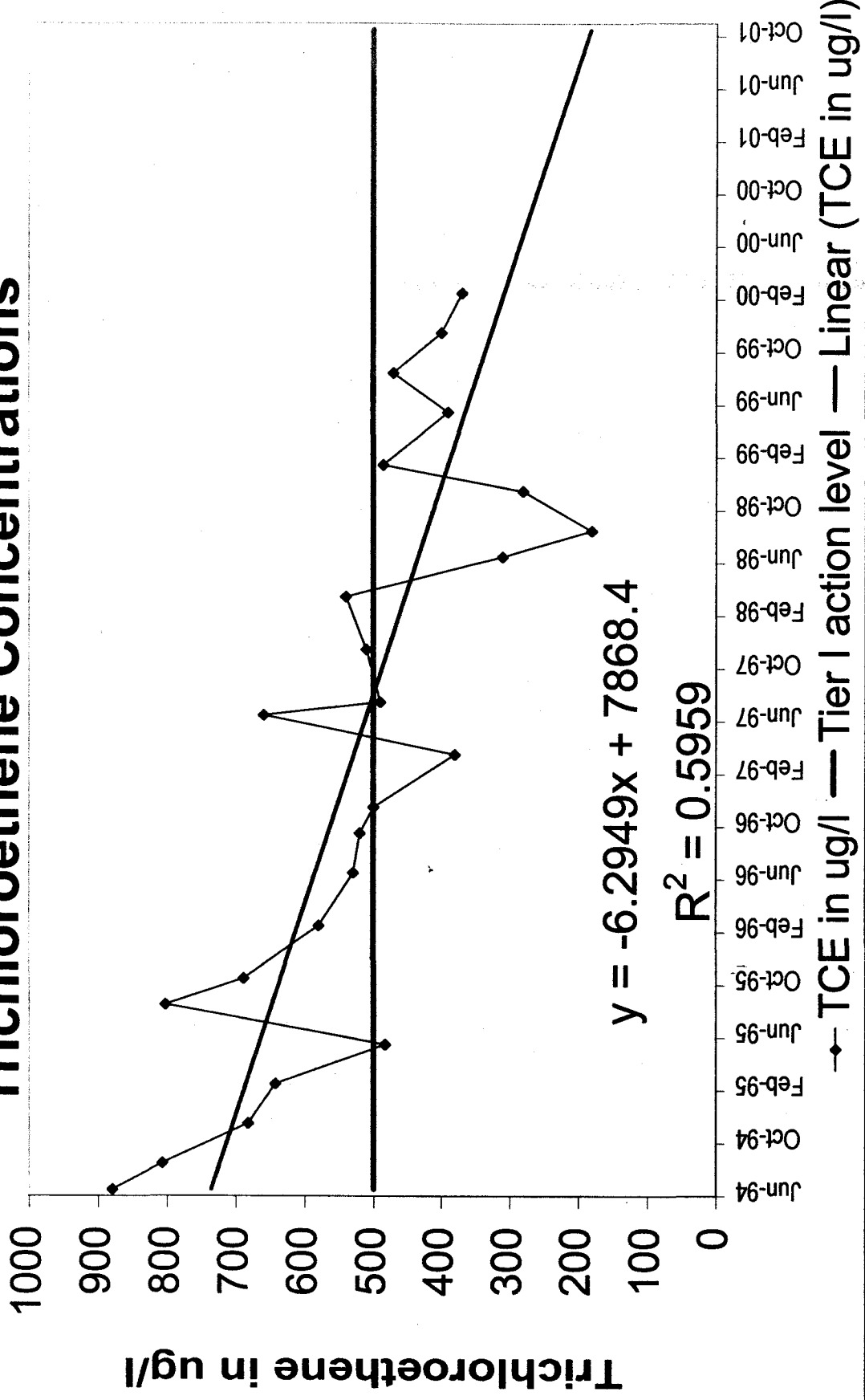
A statement was incorporated into the Modified Remedy section to indicate that natural attenuation is taking place within the plume.

3. **Monitoring elements of the proposed remedy should be consistent with the Integrated Monitoring Plan (IMP). Upon cessation of pumping, the Collection Well could become a Plume Definition Well. The IMP already recognizes wells #4787 and #4887 as Plume Extent wells for the purpose of monitoring this plume. If groundwater in these wells exceeds Tier II Action Levels, an evaluation is required to determine if remedial or management action is necessary to prevent surface water from exceeding standards. This IMP-defined decision rule should form the framework of decision statements for the OU1 remedy modification. Removing the french drain eliminates a line of defense for surface water and emphasizes the need to include an evaluation of impacts to surface water.**

Response:

The Collection Well is currently monitored as a Performance Well per the IMP in an area known to be contaminated above the Tier II action level. Upon cessation of groundwater pumping and treatment, the Collection Well will be monitored as a Plume Definition Well in accordance with the IMP. As such, the Collection Well concentrations will be monitored and evaluated against Tier I action levels and the historic contaminant data trends. If concentrations in the Collection Well are observed above Tier I action levels, impacts to surface water will be evaluated to determine if an action is necessary. This monitoring language and reference to the IMP were incorporated into the Modified Remedy section.

OU 1 Collection Well Trichloroethene Concentrations



MAJOR MODIFICATION
TO THE
OPERABLE UNIT 1: 881 HILLSIDE AREA
CORRECTIVE ACTION DECISION/RECORD
OF DECISION

Rocky Flats Environmental Technology Site
Golden, Colorado

July 2000

6

Paul Golan, Acting Manager
U.S. Department of Energy, Rocky Flats Field Office

Date

Tim Rehder
U.S. Environmental Protection Agency, Region VIII

Date

Steven Gunderson
Hazardous Materials and Waste Management Division
Colorado Department of Public Health and Environment

Date

**MAJOR MODIFICATION TO THE
OPERABLE UNIT 1
CORRECTIVE ACTION DECISION/RECORD OF DECISION**

SITE NAME AND LOCATION:

Rocky Flats Environmental Technology Site, Operable Unit 1: 881 Hillside Area, Jefferson County, Colorado

LEAD AND SUPPORT AGENCIES:

Lead:

U.S. Environmental Protection Agency (EPA), Region VIII

Support:

U.S. Department of Energy, Rocky Flats Field Office (DOE-RFFO)
Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division (CDPHE)

INTRODUCTION

The Corrective Action Decision/Record of Decision (CAD/ROD) Declaration for Operable Unit 1 (OU 1), 881 Hillside Area, Rocky Flats Environmental Technology Site (RFETS) (DOE, 1997) was signed on March 12, 1997 by representatives of the EPA, DOE-RFFO, and CDPHE. The CAD/ROD presented the selected remedy for addressing contamination in subsurface soil at Individual Hazardous Substance Site (IHSS) 119.1. Since the signing of the CAD/ROD, new sampling and analysis data were collected at IHSS 119.1. The results from this effort substantially support the need to significantly alter the selected remedy.

Paragraph 128 of the Rocky Flats Cleanup Agreement (RFCA) contains provisions for addressing and documenting major modifications to work being done pursuant to a CAD/ROD. Section 117(c) and (d) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) contains provisions for addressing and documenting changes to a remedy that occur after a ROD is signed. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) Section 300.435(c)(2)(ii) also addresses post-ROD information and public comment on post-ROD documentation. In accordance with these provisions and guidance provided in *A Guide to Preparing Superfund Proposed Plans, Records of Decisions, and other Remedy Selection Decision Documents* (EPA, 1999), a modification to the CAD/ROD has been prepared for Operable Unit 1: 881 Hillside Area. This CAD/ROD Modification addresses and documents changes to the previous CAD/ROD declaration and presents the information gained since the time that declaration was signed along with the rationale leading to this modification.

REASONS FOR ISSUING CAD/ROD MODIFICATION

As described in the original CAD/ROD (DOE, 1997), IHSS 119.1 is a former drum and scrap metal storage area. Aerial photographs indicate that these materials were primarily stored north of the Southeast Perimeter Road within IHSS 119.1. The scrap metal may have been coated with residual oils and/or hydraulic coolants (DOE, 1994). The contaminants of concern (COCs) identified in the CAD/ROD at IHSS 119.1 are:

Carbon tetrachloride,
1,1-Dichloroethene,
Tetrachloroethene,
1,1,1-Trichloroethane,
Trichloroethene,
Selenium.

Residual contamination from past releases contaminated the groundwater and subsurface soils localized in the southwest portion of the IHSS and contributed to the degradation of groundwater quality in the immediate vicinity. The selected remedial action presented in the CAD/ROD included excavation and treatment of volatile organic compound (VOC)-contaminated soil by low temperature thermal desorption and extraction of groundwater entering the excavation for treatment in the existing Building 891 water treatment system. Excavated soil with VOC concentrations greater than the Action Level Framework (ALF) Tier I subsurface soil action levels for the organic COCs (Table 1) (DOE, 1996) were to be treated onsite and returned to the excavation (DOE, 1997).

In accordance with the CAD/ROD, additional sampling was performed downgradient of IHSS 119.1 to verify that a subsurface paleochannel did not contain VOCs at levels that could significantly impact surface water quality. Eleven geoprobe boreholes were located approximately 20 feet apart along the trend of the paleochannel between well 0487 and the southern boundary of IHSS 119.1. These borings were spaced so that the deepest portion of the paleochannel was investigated. Details of downgradient sampling activities can be found in the *Sampling and Analysis Plan for the Downgradient Investigation of IHSS 119.1* (RMRS, 1997a). The results of this sampling, presented in the *Post-CAD/ROD Investigation Report for the 881 Hillside Area, IHSS 119.1* (RMRS, 1997b), indicate that the subsurface paleochannel does not contain VOCs. The COCs were not detected in the downgradient samples at a detection limit of 0.62 parts per million (ppm) (Table 1).

In addition to the sampling performed downgradient of IHSS 119.1, eleven geoprobe boreholes were advanced within IHSS 119.1 to provide data for determining health and safety requirements during the excavation. Details of the sampling can be found in the *Sampling and Analysis Plan for the Implementation Sampling for the IHSS 119.1 Source Removal Project* (RMRS, 1997c) and are summarized in Table 1. For Remedial Design/Remedial Action (RD/RA) purposes, these samples were collected in the areas tentatively identified in the CAD/ROD for excavation at IHSS 119.1.

The analytical results for the RD/RA implementation samples (RMRS, 1997b) show that the actual soil concentrations of the COCs, if detected at all, are well below the ALF Tier I subsurface soil action levels (DOE, 1996). Based on these results, it can be concluded that COC concentrations in soil within IHSS 119.1 are not above the ALF Tier I subsurface soil action levels (DOE, 1996) as previously assumed. Thus excavation and treatment of these soils is not warranted. Because this represents a fundamental change to the remedy, a modification to the OU 1 881 Hillside Area CAD/ROD (DOE, 1997) is necessary to: a) present the information gained from the downgradient and implementation borehole sampling, and b) document the rationale for changing the remedy presented in the original CAD/ROD.

DESCRIPTION OF ALTERNATIVES

Six candidate remedial alternatives were compiled and passed a detailed screening process conducted during the OU1 Corrective Measures Study/Feasibility Study (CMS/FS) (DOE, 1995). These alternatives were summarized in the CAD/ROD (DOE, 1997). From these alternatives, the original remedy, Soil Excavation with Groundwater Pumping, was selected. At the time the original remedy was selected, the subsurface soils at IHSS 119.1 were assumed to be contaminated, acting as a residual source to groundwater contamination. Based on the results of the RD/RA implementation sampling, the soil excavation component of the remedy should be eliminated. The modified remedy now reflects the lack of a subsurface source of contamination at the IHSS and results in an modified alternative: Groundwater Pumping. This alternative will be re-evaluated in this CAD/ROD Modification against the original remedy.

Original Remedy: Soil Excavation with Groundwater Pumping

The selected remedy was intended to achieve Remedial Action Objectives (RAOs) through excavation of contaminated subsurface soils and the extraction of contaminated groundwater beneath IHSS 119.1 as it entered the excavation. Based on the *Sampling and Analysis Report-Identification and Delineation of Contaminant Source Area for Excavation Design Purposes* (RMRS, 1996), the estimated volume of

contaminated soil that was planned for excavation from IHSS 119.1 was one thousand to two thousand cubic yards. The excavated subsurface soils would have been treated on-site with a thermal desorption unit and returned to the excavation.

Contaminated groundwater entering the excavation would have been extracted from the excavation and treated in the Building 891 treatment system. The existing French Drain and Building 891 treatment system would continue to operate during the remedial activities, but after remediation of the presumed source was complete, the French Drain would have been decommissioned and groundwater collection and treatment would have ceased. Groundwater monitoring would have been performed consistent with the RFETS Integrated Monitoring Plan after completion of the remedial action.

The remediation time frame presented in the CAD/ROD for the original remedy was estimated to be four to six months including decommissioning of the French Drain, excluding monitoring.

Modified Remedy: Groundwater Pumping

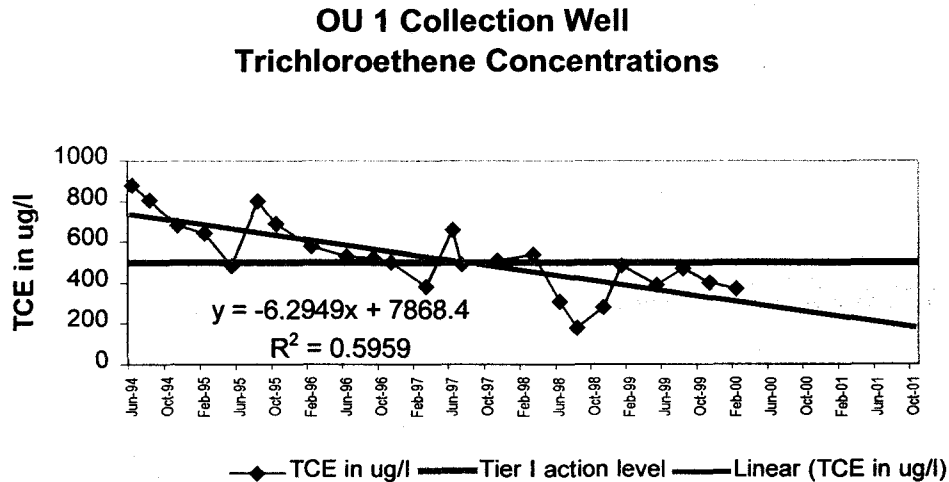
Contaminated groundwater has been extracted from the Collection Well and treated by the Building 891 treatment system since before the original CAD/ROD was signed. Contaminated groundwater will continue to be extracted from the Collection Well and treated by the Building 891 treatment system for a period consistent with the requirements of RFCA (DOE, 1996). Water quality of the groundwater removed from the Collection Well has been assessed since June 1994. The sampling and analysis was conducted on a monthly basis from June 1994 until October 1995. Quarterly monitoring has been performed since October 1995. During this time, only trichloroethene has exceeded the Tier I action level of 500 micrograms per liter ($\mu\text{g/L}$). As a result, the trichloroethene concentrations are considered a good indicator chemical for developing decision criteria.

The concentrations of trichloroethene have decreased over time and now are below the 500 $\mu\text{g/L}$ target cleanup level. A simple linear regression was used to predict whether the concentration of trichloroethene at the Collection Well would remain below the 500 $\mu\text{g/L}$ target cleanup level. Figure 1 illustrates the linear regression and prediction of concentrations based on the quarterly trichloroethene concentrations observed since June 1994. As shown, the concentrations are predicted to continue to be below the 500 $\mu\text{g/L}$ target cleanup level. Assuming that natural attenuation is taking place and the linear regression model accurately represents the system, trichloroethene concentrations will continue to decline below the target cleanup levels.

Operation of the Collection Well will continue for one year after the Major Modification to the CAD/ROD is signed by the EPA, CDPHE, and DOE-RFFO. After that time, if the declining trend for TCE concentrations in the well continue to be below the Tier I action level (500 $\mu\text{g/L}$), then pumping and treating of groundwater will be discontinued. The Collection Well will then be designated as a Plume Definition Well and monitored consistent with the RFETS Integrated Monitoring Plan (IMP). As such, the Collection Well concentrations will be monitored and evaluated against Tier I action levels and the historic contaminant data trends. If concentrations in the Collection Well are observed above Tier I action levels, impacts to surface water will be evaluated to determine if an action is necessary.

French Drain decommissioning will commence immediately. Water quality of groundwater collected by the French Drain has been sampled quarterly for laboratory analysis since 1993, in accordance with the RFETS Integrated Monitoring Plan. The water quality data indicate that groundwater contaminant concentrations are consistently below RFCA Action Level Framework Tier II groundwater action levels. The French Drain system will be breached at the lowest point and the collected groundwater will flow underground to the South Interceptor Ditch. The final details of the decommissioning of the French Drain system will be presented in the OU1 881 Hillside Area Closeout Report.

Figure 1. OU 1 Collection Well Trichloroethene Concentrations and Projection.



Consistent with the original remedy, groundwater monitoring will be performed in accordance with the RFETS IMP after completion of the remedial action. The remediation time frame for the modified remedy is estimated at two months. This time frame includes decommissioning of the French Drain but excludes continued operation of the Collection Well and monitoring.

Table 2 presents the components of the original and modified remedy.

SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

Threshold Criteria

Overall Protection of Human Health and the Environment: In the CAD/ROD, the original remedy was ranked the highest among the alternatives considered with respect to overall protection of human health and the environment because it was assumed to provide the largest reduction in exposure potential within the shortest amount of time through the removal of the contamination source (DOE, 1997). Because the soil excavation component is the only factor differentiating the original remedy from the modified remedy (i.e., all other components of the original and modified remedy remain the same), the protectiveness of human health and the environment for the modified remedy is equal.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs): ARARs identified in the original CAD/ROD are as follows:

- Classifications and Numeric Standards (5 CCR 1002-8, 3.8, So. Platte River Basin, now known as 5CCR 1002-38)
- Colorado Basic Standards for Surface Water (5 CCR 1002-8, 3.1, Segment 4a of Big Dry Creek, now known as 5 CCR 1002-31)
- Colorado Hazardous Waste Regulations (6 CCR 1007-3 Parts 264 and 268)
- Colorado Air Pollution Control Regulations (5 CCR 1001-5, Regulation 7)
- Colorado Nongame, Endangered or Threatened Species Conservation Act (CRS 33-2-1001)

In the CAD/ROD, the original remedy was expected to meet all of the ARARs identified. Because the soil excavation component is the only factor differentiating the original remedy from the modified remedy (i.e., all other components of the original and modified remedy remain the same), the ARARs identified will also be met by the modified remedy.

Primary Balancing Criteria

Long-term Effectiveness and Permanence: In the CAD/ROD, the original remedy was ranked highest among the alternatives considered with respect to long-term effectiveness and permanence since it removes both groundwater contamination and subsurface soil contamination sources in IHSS 119.1, thereby preventing any further contamination of groundwater (DOE, 1997). It was determined through the CAD/ROD implementation sampling that subsurface soil contamination sources within IHSS 119.1 do not exist and, as a result, further contamination of groundwater is not anticipated. Because the soil excavation component is the only factor differentiating the original remedy from the modified remedy (i.e., all other components of the original and modified remedy remain the same), the long-term effectiveness and permanence for the modified remedy is equal.

Reduction of Toxicity, Mobility, or Volume Through Treatment: In the CAD/ROD, the original remedy was ranked highest among the alternatives considered with respect to reduction of mobility because it was assumed that the remedy would remove the primary source of contamination and treat contaminated groundwater. The original remedy was assumed to prevent any further migration of contamination to the groundwater (DOE, 1997). Additionally, the original remedy was ranked highest with respect to the reduction of toxicity and volume through treatment because of the soil excavation and treatment. It was determined through the CAD/ROD implementation sampling that subsurface soil contamination sources in IHSS 119.1 do not exist and, as a result, further contamination of groundwater (i.e., contaminant mobility from the source) is not anticipated. Without the soil excavation component of the remedy, additional reduction of toxicity and volume will not be realized. Because the soil excavation component is the only factor differentiating the original remedy from the modified remedy (i.e., all other components of the original and modified remedy remain the same), achievement of a reduction of contaminant mobility, toxicity and volume through treatment for the modified remedy is equal.

Short-term Effectiveness: This criterion evaluates community, environmental and site worker protection during implementation of the remedy. It also evaluates the effectiveness and reliability of protective measures during implementation and the time until RAOs are achieved.

With respect to community, environmental, and site worker protection during implementation, the original remedy was ranked similarly to the other alternatives considered because, other than the no action and institutional control alternatives, all included some site disturbance (DOE, 1997). Comparing the original remedy to the modified remedy, the potential for site disturbance is reduced because soil excavation will not occur. Decommissioning of the French Drain is the same for both the original and modified remedy. The short-term impact for the modified remedy is therefore considered lower than the original remedy.

With respect to the effectiveness and reliability of protective measures during implementation and for the time until RAOs are achieved, the original remedy was ranked the highest with respect to the other alternatives. This ranking was assigned because, as stated in the CAD/ROD, excavation was considered to be the most effective and reliable of the technologies considered (DOE, 1997). Comparing the original remedy to the modified remedy, the need for protective measures during implementation is reduced because soil excavation will not occur. Decommissioning of the French Drain is the same for both the original and modified remedy. The rank of the modified remedy is therefore considered higher than the original remedy.

For the original remedy, compliance with RAOs was anticipated to be achieved in four to six months, the time necessary to complete the soil excavation. It was determined through the CAD/ROD implementation sampling that subsurface soil contamination sources within IHSS 119.1 do not exist and, as a result, further contamination of groundwater is not anticipated and the RAOs with respect to this portion of the remedy are achieved at present.

Implementability: This criterion evaluates the technical and administrative feasibility of implementing the alternative including the availability of materials and services needed during implementation, as well as the ability to monitor the effectiveness of the remedy.

In the CAD/ROD, the original remedy was ranked medium in comparison to the other alternatives considered with respect to implementability (DOE, 1997). This ranking was applied because excavation was considered effective and the equipment necessary to excavate and treat the contaminated soil was readily available. Because the soil excavation component is the only factor differentiating the original remedy from the modified remedy (i.e., all other components of the original and modified remedy remain the same), the modified remedy is considered to rank higher (i.e., is easier to implement) than the original remedy because excavation and treatment will not occur.

Cost: This criterion evaluates the capital cost for each alternative, long-term operation and maintenance (O&M) expenditures required to sustain it, and post-closure care costs occurring after the completion of remediation. Future expenditures are adjusted to present worth amounts by discounting all costs to a common base year using present worth cost analysis.

The cost of the original remedy presented in the CAD/ROD was \$3.5 million. The cost of the modified remedy is reduced substantially because the soil excavation component and treatment costs are eliminated. The cost of the modified remedy is estimated to be \$200,000.

NEPA Values

The environmental impacts of installation and operation of the French Drain and water treatment system were considered in the *Environmental Assessment and Findings of No Significant Impact for the 881 Hillside (High Priority Sites) Interim Remedial Action* (DOE, 1990) (EA). As stated in the EA, the excavation of soils would increase the environmental impact of the action; as now proposed, not excavating the substantial amount of soil would lessen the impact of remediating OU1: 881 Hillside Area. Ceasing operation of the French Drain will have no increased short term or long term environmental impact because historical data indicate that contaminants of concern are below acceptable levels as indicated in the Interim Remedial Action. For the Collection Well, since the reason for the modification is the actual monitored decline of contaminants to levels below Tier I action levels and a projected continued decline in contaminant levels, no environmental impacts are projected.

Modifying Criteria

State Acceptance: This criterion addresses the State's comments and concerns regarding the appropriateness of the selected remedy. The State of Colorado was represented during meetings which lead to the elimination of the soil excavation component of the original remedy and agreed with the modified remedy. At that time, the State had no outstanding, significant comments or concerns with the modified remedy.

Community Acceptance: This criterion evaluates the selected remedy (original or modified) in terms of issues and concerns raised by the public through the public involvement process. ALL COMMENTS RECEIVED ON THE MODIFIED REMEDY WILL BE ADDRESSED IN THE ATTACHED RESPONSIVENESS SUMMARY.

Anticipated Damages to Natural Resources: The modified remedy will not result in any irreversible damages to natural resources and the quality of groundwater will improve by treatment and natural degradation processes.

THE MODIFIED REMEDY

The components of the modified remedy are detailed below:

- 1) The elements of the modified remedy for IHSS 119.1 selected to meet the RAOs include:

Downgradient investigation: DOE has performed confirmatory soil sampling downgradient of IHSS 119.1 to verify that a contamination source does not exist there. A detailed sampling and analysis plan was prepared.

Groundwater extraction and treatment: Groundwater will continue to be extracted from the extraction well and transferred to the existing Building 891 treatment system for final treatment and discharge for a period of one year after signing the Major Modification to the CAD/ROD.

French Drain decommissioning: The French Drain system will be decommissioned and its use will be discontinued. The original OU1 CAD/ROD stated that final details of decommissioning of the French Drain would be presented in the Remedial Design for OU1. Since no further remedial action is required to meet the RAOs, a formal Remedial Design will not be prepared. Details of the decommissioning of the French Drain will be presented in a project Work Plan and in the OU1 881 Hillside Area Closeout Report.

Groundwater monitoring: Groundwater monitoring will be performed at IHSS 119.1, consistent with the RFETS IMP, after the remedial action is complete.

- 2) Institutional controls will be maintained throughout the OU 1 area in a manner consistent with RFCA, Rocky Flats Vision, and the ALF. These documents recognize the reasonably foreseeable future land use for the OU 1 area is restricted open space. The institutional controls will ensure that the restricted open space land use is maintained for the OU 1 area and that domestic use of groundwater is prevented.
- 3) Because of the groundwater and land use controls, the low amounts of contamination in OU 1 outside of IHSS 119.1, and the low levels of risk associated with the contamination, no remedial action will be taken at the remaining IHSSs in OU 1.

Implementing the modified remedy will not result in any irreversible damages to natural resources. Wetlands will not be injured; flood elevations will not be affected; and no permanent displacement or loss of wildlife will result from the implementation of the modified remedy.

STATUTORY DETERMINATIONS

The modified remedy for OU 1 satisfies the statutory requirements of CERCLA Section 121. The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The remedy satisfies the statutory preference for remedies that employ treatment that reduces, toxicity, mobility, or volume as a principal element. Because this remedy will result in hazardous substances remaining in groundwater, a review will be conducted within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

ADMINISTRATIVE RECORD

The documents listed in the reference section of this CAD/ROD Modification identify the documents that constitute the Administrative Record (AR) file for this CAD/ROD Modification per 40 CFR 300.825(a)(2). Upon completion of the public comment period, comments received from the public will be added to this AR file, along with the responsiveness summary and the Lead Regulatory Agency (LRA) approval letter. LRA approval of this CAD/ROD Modification constitutes approval of this AR file. The AR file is available at the following locations:

Rocky Flats Reading Room
Front Range Community College Library, Level B
3645 West 112th Avenue
Westminster, Colorado 80030

Office of Customer Service
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South, A1
Denver, Colorado 80222

Citizens Advisory Board
9035 Wadsworth Parkway, Suite 2250
Westminster, Colorado 80021

U.S. Environmental Protection Agency, Region VIII
Superfund Records Center
999 18th Street
Denver, Colorado 80202-2466

REFERENCES

- DOE, 1990, *Environmental Assessment and Findings of No Significant Impact for the 881 Hillside (High Priority Sites) Interim Remedial Action*, January, 1990.
- DOE, 1994, *Final Phase III RCRA Facility Investigation/Remedial Investigation*, Rocky Flats Plant, 881 Hillside Area, Operable Unit 1, Department of Energy, Rocky Flats Plant, Golden, Colorado, June 1994.
- DOE, 1995, *OU-1, 881 Hillside Area, Corrective Measures Study/Feasibility Study*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, Colorado, February 1995.
- DOE, 1996, *Final Rocky Flats Cleanup Agreement*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, Colorado, July 16, 1996.
- DOE, 1997, *Corrective Action Decision/Record of Decision, Operable Unit 1: 881 Hillside Area*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, Colorado, February, 1997.
- EPA, 1999, *A Guide to Preparing Superfund Proposed Plans, Records of Decisions, and other Remedy Selection Decision Documents*.
- IMP Working Group, 1999, *Rocky Flats Environmental Technology Site Integrated Monitoring Plan Background Document FY2000*, September 1999.
- RMRS, 1996, *Sampling and Analysis Report, Identification and Delineation of Contaminant Source Area For Excavation Design Purposes*, IHSS 119.1, Operable Unit 1, Department of Energy, Rocky Flats Environmental Technology Site, Golden, Colorado, April 1996.
- RMRS, 1997a, *Sampling and Analysis Plan for the Downgradient Investigation of IHSS 119.1*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, Colorado, April, 1997.
- RMRS, 1997b, *Post-CAD/ROD Investigation Report for the 881 Hillside Area, IHSS 119.1*, Department of Energy, Rocky Flats Environmental Technology Site, Golden, Colorado, April, 1997.
- RMRS, 1997c, *Sampling and Analysis Plan for the Implementation Sampling for the IHSS 119.1 Source Removal Project*, Rocky Flats Environmental Technology Site, Golden, Colorado, RF/RMRS-97-009, April, 1997.

Other Documents

- DOE, 1999, Letter from Joseph Legare (DOE) to Tim Rehder (EPA), recommending a path forward to closeout the OU 1 CAD/ROD, Ref. 00-DOE-00704, December 14, 1999.
- EPA, 1997, Letter from Tim Rehder (EPA) to Steve Slaten (DOE), regarding OU 1 Investigation and Record of Decision, Ref. 8EPR-F, July 7, 1997.
- EPA, 1999, Letter from Tim Rehder (EPA) to Joseph Legare (DOE), regarding OU 1 CAD/ROD Modification recommendations, Ref. 8EPR-F, December 29, 1999.
- DOE, 2000, Letter from Joseph Legare (DOE) to Tim Rehder (EPA), regarding submittal of Draft Proposed Major Modification to the OU1 CAD/ROD, Ref. 00-DOE-0143, February 8, 2000.
- CDPHE, 2000, Letter from Steven Gunderson, (CDPHE) to Tim Rehder (EPA), regarding Draft Proposed Modification to OU1 CAD/ROD, March 3, 2000.
- EPA, 2000, Letter from Tim Rehder (EPA) to Joseph Legare (DOE), regarding Draft Proposed Modification to OU1 CAD/ROD, Ref. 8EPR-F, March 6, 2000.

Table 1. RFCA Tier I Subsurface Soil Action Levels, Results of the Downgradient and IHSS 119.1 Investigation.

COC	ACTION LEVEL (MG/KG)	DOWNGRADIENT INVESTIGATION - FOD ¹	DOWNGRADIENT INVESTIGATION RESULTS (MG/KG)	IHSS 119.1 BOREHOLE SAMPLING - FOD ¹	IHSS 119.1 BOREHOLE SAMPLING RESULTS (MG/KG)
Carbon Tetrachloride	3.56	0/13	0.62 U	0/38	0.62 U
1,1-Dichloroethene	2.19	0/13	0.62 U	2/38	0.17J - 0.23J ²
Tetrachloroethene	3.15	0/13	0.62 U	3/38	0.16J - 0.66 ²
1,1,1-Trichloroethane	94.8	0/13	0.62 U	2/38	0.16J - 0.28J ²
Trichloroethene	3.28	0/13	0.62 U	2/38	0.34J - 0.55J ²

¹FOD = Frequency of Detection represents the number of detections/number of samples. Number of samples does not include duplicates.

² Range of detected values.

U = COC was not detected at the level indicated.

J = estimated concentration at the level indicated. The concentration represents a value below the detection limit.

Table 2. Primary components of the Original and Modified Remedies for OU 1.

Original Remedy	Modified Remedy
<p>1) The principal components of the original remedy at IHSS 119.1 selected to meet the RAOs included:</p> <p><u>Excavation of soil:</u> Excavation of contaminated subsurface soils was in two contamination sources areas identified during a 1996 soil gas survey. The location of these two areas was identified in the CAD/ROD. From the soil gas survey results, it was estimated that the amount of soil that to be excavated was one thousand to two thousand cubic yards. During the excavation, sampling was to be performed to confirm the point at which all contaminated subsurface soil had been removed, in accordance with the ALF. A detailed soil excavation plan and sampling and analysis plan would be prepared as part of the RD.</p> <p><u>Downgradient investigation:</u> DOE would perform confirmatory soil sampling downgradient of IHSS 119.1 to verify that a contamination source does not exist there. A detailed sampling and analysis plan would be prepared as part of the RD.</p> <p><u>Groundwater extraction and treatment:</u> Groundwater was to be extracted from the excavation and transferred to the existing Building 891 treatment system for final treatment and discharge.</p> <p><u>French Drain Decommissioning:</u> After all contaminated subsurface soil was excavated and all contaminated groundwater was extracted from the excavation, the French Drain system was to be decommissioned and its use discontinued. The final details of the groundwater extraction and decommissioning of the French Drain system were to be presented in the RD for OU 1.</p> <p><u>Handling and management of excavated soil:</u> DOE considered three options for managing the excavated soil. The option agreed upon was on-site treatment and placement back into the original excavation. The details of how the excavated soil was to be handled and managed would have been prepared as part of the RD.</p> <p><u>Groundwater monitoring:</u> Groundwater monitoring was to be performed at IHSS 119.1, consistent with the Integrated Water Management Plan, after the remedial action was complete. The details of this groundwater monitoring were to be presented in the RD.</p>	<p>1) The principal components of the modified remedy for IHSS 119.1 selected to meet the RAOs included:</p> <p><u>Downgradient investigation:</u> DOE has performed confirmatory soil sampling downgradient of IHSS 119.1 to verify that a contamination source does not exist there. A detailed sampling and analysis plan was prepared.</p> <p><u>Groundwater extraction and treatment:</u> Groundwater will continue to be extracted from the Collection Well and transferred to the existing Building 891 treatment system for final treatment and discharge for a period of one year to verify that the declining trend will continue.</p> <p><u>French Drain Decommissioning:</u> The French Drain system will be decommissioned and its use will be discontinued. The final details of the decommissioning of the French Drain system will be presented in the OU1 881 Hillside Closeout Report.</p> <p><u>Groundwater monitoring:</u> Groundwater monitoring will be performed at IHSS 119.1, consistent with the RFETS Integrated Monitoring Plan, after the remedial action is complete.</p>
<p>2) Institutional controls will be maintained throughout the OU 1 area in a manner consistent with RFCA, Rocky Flats Vision, and the ALF. These documents recognize the reasonably foreseeable future land use for the OU 1 area is restricted open space. The institutional controls will ensure that the restricted open space land use is maintained for the OU 1 area and that domestic use of groundwater is prevented. If the reasonably foreseeable future land use for OU 1 area changes when final sitewide land use decisions are made, this remedy will be reexamined to ensure protectiveness of human health and the environment. The specific mechanisms (for example, deed restrictions) to ensure the implementation and continuity of the necessary institutional controls have not been included in this CAD/ROD. Currently, these mechanisms are envisioned to be placed in the Final Sitewide CAD/ROD or in this CAD/ROD during one of the five-year reviews of this document. However, should the Final CAD/ROD not occur or not include these institutional control mechanisms, this OU 1 CAD/ROD will be revised to include them, if it does not already include them as a result of a five-year review. The institutional controls can also be removed at one of the above times, if it is deemed appropriate to do so by the parties.</p>	<p>2) Institutional controls will be maintained throughout the OU 1 area in a manner consistent with RFCA, Rocky Flats Vision, and the ALF. These documents recognize the reasonably foreseeable future land use for the OU 1 area is restricted open space. The institutional controls will ensure that the restricted open space land use is maintained for the OU 1 area and that domestic use of groundwater is prevented.</p>
<p>3) Because of the groundwater and land use controls, the low amounts of contamination in OU 1 outside of IHSS 119.1, and the low levels of risk associated with the contamination, no remedial action will be taken at the remaining IHSSs in OU 1.</p>	<p>3) Because of the groundwater and land use controls, the low amounts of contamination in OU 1 outside of IHSS 119.1, and the low levels of risk associated with the contamination, no remedial action will be taken at the remaining IHSSs in OU 1.</p>

RESPONSIVENESS SUMMARY

OVERVIEW

SUMMARY OF COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD AND DOE RESPONSES

19/19